

REMARKS

Claims 1-17 are pending. Claim 17 is amended in order to correct the antecedent basis of "said oligomerizing." No new matter is believed to be added upon entry of the amendment. Upon entry of the amendment, Claims 1-17 remain active.

Applicants thank Examiners Bullock and Griffin for conducting the kind and courteous discussion with Applicants' representative, Daniel R. Evans. The content of the discussion is reflected in the following remarks.

The provisional rejection of Claims 1-14 under the judicially created doctrine of obviousness-type double patenting over Claims 1-8 of US 10/467,844 (US '844) in view of US 5,177,289 (US '289) and US 5,877,372 (US '372) is respectfully traversed.

It is noted that an aspect of the oligomerization process, which comprises *oligomerizing isobutene in the presence of n-butene* over a solid, acidic ion exchanger having acidic protons; wherein at least one acidic proton of said ion exchanger has been exchanged for a metal ion (see Claim 1), is not suggested by the combined disclosures of US '844, US '289, and US '372 .

Claim 1 of US '844 is directed to "a process for preparing high-purity diisobutene comprising: reacting isobutene or isobutene-containing hydrocarbon mixtures in the presence of a solid acidic ion-exchange resin containing sulfonic acid groups whose protons have been partly replaced by metal ions" (Emphasis added). An issue to resolve is whether the language of Claim 1 which reads "oligomerizing isobutene in the presence of n-butene" reads on the term "reading isobutene-containing hydrocarbon mixtures" of Claim 1 of US '844. That is, does the term "hydrocarbon mixtures" of US '844 suggest n-butene?

It is noted that the 'words of a claim must be given their "plain meaning" unless they are defined in the specification' (see MPEP 2111.01). It is also noted that none of allowed

Claims 1-14 of US '844 provide a meaning of the term "hydrocarbon mixtures." The Examiner's attention is directed to the published specification of US '844, US 2004/0054246 (US '246). In particular, paragraph 45 of US '246 explicitly states that "an isobutene-containing hydrocarbon mixture" is one that contains "no further unsaturated compounds." The Examiner's attention is also directed to page 5 of US '246, which discloses Examples 2-5. Specifically, the Examiner's attention is directed to the content of the feed mixtures disclosed in these examples. In each of the examples in which the feed mixtures contain isobutene-containing hydrocarbon mixtures, none of these mixtures contain additional unsaturated compounds. That is, the only unsaturated compound in the feed mixture is isobutene. Therefore, Claim 1 of US '844 not only fails to suggest "oligomerizing isobutene in the presence of n-butene," when read in light of the specification, US '844 explicitly discloses that oligomerization of isobutene should occur in the absence of n-butene. It is noted that conventional wisdom prior to the present application is that it is undesirable to have n-butene present in the reaction mixture due to the possibility of rearrangement to 2-butene and due to the possibility of isobutene/n-butene dimerization (see present application text page 1, line 29 – page 2, line 23).

In regard to the disclosure of US '372, isobutylene is obtained by dehydration of tertiary butanol over an alumina dehydration catalyst at both elevated temperature and pressure (see US '372 at col. 3, lines 60-67), in which the only unsaturated compound present in the product stream is isobutylene. It is noted that US '289 discloses that that a feed stream containing isobutene also contains n-butenes (see US '289 at col. 5, lines 50-53), but this disclosure is in conflict with US '844 because US '289 employs resins that contain only sulfonic acid groups (see US '289 at col. 5, lines 12-20).

Accordingly, it is believed that the provisional rejection of Claims 1-14 over the combined disclosures of US '844, US '372, and US '289 is improper for the reasons outlined

above. It is respectfully requested that the Examiner acknowledge the same and withdraw this rejection.

The provisional rejection of Claims 15-17 under the judicially created doctrine of obviousness-type double-patenting over Claims 1-2 of US '844 in view of US 4,313,016 (US '016) is respectfully traversed.

It is noted that Claim 15 is directed to a process for preparing 1-butene from C<sub>4</sub>-hydrocarbon comprising: converting a C<sub>4</sub>-hydrocarbon mixture over an acidic, solid ion exchanger having acidic protons; wherein at least one acidic protons of said ion exchanger has been exchanged for a metal ion, thereby obtaining a reaction product; and wherein the 1-butene is removed from the reaction product by distillation.

As discussed above, Claim 1 of US '844 does not suggest a process for preparing 1-butene. Claim 1 of US '844 is directed to a process that includes reacting isobutene-containing hydrocarbon mixtures in the presence of a solid acidic ion-exchange resin containing sulfonic acid groups whose protons have been partly replaced by metal ions, but the hydrocarbon mixtures do not contain 1-butene or any other unsaturated compounds.

US '016 is directed to a process in which "isobutene in C<sub>4</sub> hydrocarbon streams containing from 0.5 to 5% isobutene and n-butenes is reduced preferably to a level of 0.2 mole % (see Abstract) by contacting the C<sub>4</sub> hydrocarbon streams with a fixed-bed cation exchange resin catalyst. US '016 discloses that the catalyst contains sulfonic acid groups, but does not disclose or suggest to employ a catalyst in which at least one acidic protons of said ion exchanger has been exchanged for a metal ion.

Accordingly, it is believed that the combination of US '844 and US '016 do not suggest the processes recited in Claims 15-17. It is respectfully requested that the Examiner acknowledge the same and withdraw this rejection.

The rejection of Claim 17 under 35 U.S.C. § 112, second paragraph, is obviated by amendment.

Claim 17 is amended to read "said oligomerizing." It is believed that the antecedent issue discovered by the Examiner has now been resolved.

It is respectfully requested that the Examiner withdraw this rejection.

In view of the amendments to the claims and the remarks contained herewith, it is believed that the present application is now in a condition for allowance. Should the Examiner deem that a personal or telephonic interview would be helpful in advancing this application toward allowance, she is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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